

REMARKS

Claims 1-20 are presently pending in the application.

I. THE TITLE

The Examiner has objected to the title, "A Liquid-Crystal Display Device With Sloped Surface Light Pipe." The grounds of objection state that the aforementioned title is not descriptive.

The title is herein amended to "Liquid Crystal Display Illumination Device Operating in Reflection and Transmission Modes." Applicant believes such to overcome the grounds of objection.

II. REJECTION UNDER 35 U.S.C. § 102(E) OVER U.S.P. NO. 6,199,995 TO UMEMOTO ET AL. (THE '995 PATENT)

Claims 1-20¹ have been rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by the '995 patent. For the following reasons, this rejection is respectfully traversed.

Independent Claim 1

Independent claim 1 recites (among other things) that a liquid-crystal shutter is disposed above the upper surface of the light pipe. *See, e.g.*, Fig. 1 of the present application wherein liquid-crystal shutter 4 is disposed above a light pipe 1. At least these features are neither disclosed nor suggested by the prior art used in the grounds of rejection.

¹ Please note that while the instant Office Action indicates that claims 13-20 have been rejected over the '995 patent, Primary Examiner Parker indicated in a phone conversation that claims 1-20 were intended to be rejected over the reference.

The grounds of rejection compares the following elements of the '995 patent to previous recitation of claim 1: a light guide 1, a polarizer plate 5, a cell substrate 61, and a liquid crystal layer 62. As can be seen in the '995 patent, Fig. 8 illustrates a light guide 1, a polarizer plate 5, a cell substrate 61, and a liquid crystal layer 62. However, assuming *arguendo* that layers 5, 61, and 62 correspond to a liquid-crystal shutter and that light guide 1 corresponds to a light pipe, the layers 5, 61, and 62 are disposed below the light pipe 1 instead of above the light pipe as recited in instant claim 1.

In light of at least the previous reasons, it is asserted that the present application recites features that are altogether different from the prior art used in the grounds of rejection. That is, the '995 patent does not teach or suggest the claimed relationship between the liquid-crystal shutter and the light pipe. Accordingly, it is averred that claim 1 is patentable over the cited reference and the Examiner is therefore respectfully requested to reconsider and withdraw this anticipation rejection.

Dependent Claims 2 - 11

Claims 2 - 11 depend directly or indirectly upon claim 1, and are therefore averred to be patentable at least by virtue of such dependency (as well as in addition to the individual recitations of the claims).

Independent Claim 12

Independent claim 12 recites (among other things) a light pipe comprising a lower surface with which a reflection layer is directly integrated. At least these features are neither disclosed nor suggested by the prior art used in the grounds of rejection.

The grounds of rejection compares the following elements of the '995 patent to the above-recitation of independent claim 12: a light guide plate 18, liquid crystal cells 61, liquid crystal layer 62 and reflective layer 64. *See* Figure 8 of the '995 patent in comparison to Figure 1 (elements 1 (light pipe), 12 (lower surface of the light pipe) and 3 (reflective layer directly integrated to the lower surface of the light pipe)) of the instant application.

In comparison to the instant application, the reflective layer 64 is not directly integrated with the light pipe. Indeed, reflective layer 64 is separated from the light pipe by liquid crystal cells 61 and liquid crystal layer 62. It is well-known in the optical arts that liquid crystal cells and liquid crystal layers: (1) are not light pipes, and (2) should be recognized as different elements from light pipes in terms of optical function.

In light of at least the previous reasons, it is asserted that the present application recites features that are altogether different from the prior art used in the grounds of rejection. That is, the '995 patent does not teach or suggest the claimed relationship of the light pipe to the reflective layer. Accordingly, it is averred that claim 12 is patentable over the cited reference and the Examiner is therefore respectfully requested to reconsider and withdraw this anticipation rejection.

Claims 13 - 20

Claims 13 - 20 depend directly or indirectly upon claim 12, and are therefore averred to be patentable at least by virtue of such dependency (as well as in addition to the individual recitations of the claims).

III. REJECTION UNDER 35 U.S.C. § 103(A) OVER U.S.P. 5,485,291 TO QIAO ET AL. (“QIAO”) AND U.S.P. 5,532,852 TO KALAMANASH (“KALAMANASH”)

Claims 1-20 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Qiao and Kalamanash (collectively, the “prior art”). For the following reasons, this rejection is respectfully traversed.

Burden of Proof

As a threshold point, the Examiner’s attention is drawn to § 2142 of the Manual of Patent Examining Procedure, wherein it states that “[w]ith regard to rejections under 35 U.S.C. § 103, the examiner must provide evidence which as a whole shows that the legal determination sought to be proved (i.e., the reference teachings establish a prima facie case of obviousness) *is more probable than not.*” (Emphasis supplied.) Accordingly, the burden of proof used to analyze the present 35 U.S.C. § 103 rejection is one of “more probable than not.” On a sliding scale, “more probable than not” is often placed at 50.1%, or that place where counter-balanced scales would just begin to tip.

Independent Claim 1

Independent claim 1 recites (among other things) light output means for outputting light. It is asserted that at least these features are neither taught or suggested by the prior art relied upon in the grounds of rejection.

By way of explanation, because independent claim 1 includes “means for” recitations that fulfill the requirements of M.P.E.P. § 2181 (2003), the Examiner must not “disregard the structure disclosed in the specification corresponding to such language when rendering a

patentability determination.” Id. (quoting In re Donaldson Co., 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994)).

Accordingly, independent claim 1, by virtue of the above-referenced “means for” recitation, includes the “corresponding structure, materials [and/]or acts in the specification.” Id. For example, the structure disclosed on pages 7 to 10 of the instant specification is particularly relevant. Among other structure cited on pages 7 to 10, the light output means includes prism-like irregularities (*see* page 7 at lines 19 and 20). It is asserted that these prism-like irregularities constitute a slope configuration that is entirely opposite to that disclosed in the prior art cited in the grounds of rejection, as explained below.

In the instant application, the prism-like irregularities possess a long side and a short side (*see* the instant specification at Page 7, line 26, to Page 8, line 1; and Figure 2, elements 11a and 11b). The short sides 11a appreciably face the light incident surface 13, reflecting light from the light incident surface to the lower surface of the light pipe. (See Page 8, lines 18 to 23.)

The grounds of rejection compare the short and long sides of Qiao’s facets (23 and 24, respectively) to the short and long sides of the prism-like irregularities 11a, 11b of the instant application. However, the configuration of the slopes in Qiao (the “slopes” being the short and long sides of Qiao’s facets 23, 24) is inverse in comparison to the slope of the prism-like irregularities constituted by the short and long sides 11a, 11b of the instant application.

That is, in Qiao, the long side of the slope faces the light incident side of the light pipe (*see* Column 2, lines 60 - 63; and Figures 8 and 9, element 23), and the Kalamash reference is silent as to any type of slope. In contrast, in the instant application, the short side of the slope

faces the light incident side of the light pipe. (*See* page 8, lines 18 - 23; and Figures 1 and 2, element 11a.) Simply stated, the configurations of the slopes are entirely opposite of each other.

In light of the previous, it is asserted that the present application recites features that are altogether different from the prior art used in the grounds of rejection. Accordingly, it is averred that independent claim 1 is patentable over the cited references and the Examiner is therefore respectfully requested to reconsider and withdraw this rejection.

Additional differences between the cited references and the instant application include the fact that in Qiao, light is not output at the facets 23, 24 (whereas in the instant invention the light is output through the light output means which includes the prism-like irregularities 11a, 11b). In contrast, in Qiao, light is only diffused at the facets 23, 24.

Moreover, in Qiao, since the light transmitted in the light pipe is diffused by the facets 23, 24, the light output from the lower face that might arguably be reflected is not well conversed as compared to the instant invention. Finally, assuming for argument's sake that Qiao's facets 23, 24 did somehow constitute a light output means, Qiao not only has facets 23, 24, but also has a flat "land" between each repetition of the facets (*see* Column 2, lines 55 to 59). In contrast, the instant invention would perform the same task with only a repetition pitch of short and long sides, without any spaces between the repetition pitch of the prism-like irregularities (*see* Figure 2). As to this issue, M.P.E.P. § 2144.04 (II)(B) controls, stating that "omission of an element with retention of the element's function is an indicia of unobviousness."

In light of the previous reasons, it is asserted that the present application recites features that are altogether different from the prior art used in the grounds of rejection. Accordingly, it is

asserted that independent claim 1 is patentable over the cited references and the Examiner is therefore respectfully requested to reconsider and withdraw this rejection.

Claims 2 - 11

Any claim depending from a nonobvious claim is also nonobvious. *See* M.P.E.P. § 2143.03. Claims 2 - 11 depend directly or indirectly upon claim 1, and are therefore averred to be patentable at least by virtue of such dependency (as well as in addition to the individual recitations of the claims).

Independent Claim 12

Independent claim 12 recites (similarly to the above-arguments and among other things) the light output means comprising slopes facing the incident side surface and inclined at an angle of from 35 to 45 degrees with respect to a reference plane of the lower surface. At least these features are neither taught or suggested by the prior art relied upon in the grounds of rejection.

The grounds of rejection compare the long sides of Qiao's facets 23 to the short sides of the prism-like irregularities 11a of the instant application (the short sides in the instant application being the sides that face the light incident face and being of a larger angle in reference to the lower surface reference point than the longer-sided and smaller-angled slope 11b). However, the configuration of the slopes in Qiao (the "slopes" being the short and long sides of Qiao's facets 23, 24) is inverse in comparison to the slope of the prism-like irregularities constituted by the short and long sides 11a, 11b of the instant application.

That is, in Qiao, the long side of the slope faces the light incident side of the light pipe (*see* Column 2, lines 60 - 63; and Figures 8 and 9, element 23), and the Kalamash reference is

silent as to any type of slope. In contrast, in the instant application, the short side of the slope faces the light incident side of the light pipe. (See page 8, lines 18 - 23; and Figures 1 and 2, element 11a.)

In light of the previous, it is asserted that the present application recites features that are altogether different from the prior art used in the grounds of rejection. Accordingly, it is asserted that independent claim 1 is patentable over the cited references and the Examiner is therefore respectfully requested to reconsider and withdraw this rejection.

Similarly to the previous arguments in relation to claim 1 (and not fully again recited here as such would be repetitive), additional differences between the cited references and the instant application include: (1) the fact that in Qiao, light is not output at the facets 23, 24; (2) in Qiao, light is only diffused at the facets 23, 24; (3) in Qiao, since the light transmitted in the light pipe is diffused by the facets 23, 24, the light output from the lower face that might arguably be reflected is not well conversed as compared to the instant invention; and (4) assuming for argument's sake that Qiao's facets 23, 24 did somehow constitute a light output means, Qiao not only has facets 23, 24, but also has a flat "land" between each repetition of the facets, whereas the instant invention does not require a flat "land" between each repetition of the facets.

Claim 13 - 20

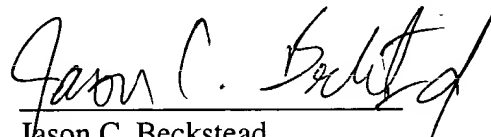
Any claim depending from a nonobvious claim is also nonobvious. See M.P.E.P. § 2143.03. Claims 13 - 20 depend directly or indirectly upon claim 12, and are therefore averred to be patentable at least by virtue of such dependency (as well as in addition to the individual recitations of the claims).

IV. CONCLUSION

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


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WASHINGTON OFFICE



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PATENT TRADEMARK OFFICE

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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

The title is changed as follows:

~~A Liquid Crystal Display Device With Sloped Surface Light Pipe~~

Liquid Crystal Display Illumination Device Operating in Reflection and Transmission Modes

IN THE CLAIMS:

The claims are amended as follows:

1. (Amended) A liquid-crystal display device comprising:

a light pipe including light output means for outputting light, said light output means
formed on an upper surface of said light pipe;

a light source disposed near ~~to an incident side surface of said light pipe so that light~~
~~incident from said light source is output from a lower surface of said light pipe through said light~~
~~output means~~ an incident side surface of said light pipe, light travelling along said light pipe
being reflected toward a lower surface of said light pipe;

a reflection layer disposed on said lower surface of said light pipe so that said reflected
light ~~of said output light~~ is again reflected, toward the upper surface of said light pipe, to be
transmitted through said upper surface of said light pipe; and a liquid-crystal shutter disposed
above said upper surface of said light pipe, said liquid-crystal shutter including liquid-crystal
cells and at least one polarizing plate.

12. (Amended) A light pipe comprising:

an incident side surface;

an upper surface;

a lower surface with which a reflection layer is directly integrated; and

light output means formed on said upper surface so that incident light from said incident side surface is ~~output from~~ reflected toward said lower surface ~~through said light output means,~~ and rereflected light of output light reflected by the reflection layer is to be transmitted through said upper surface,

wherein said light output means comprises:

slopes facing said incident side surface and inclined at an angle of from 35 to 45 degrees with respect to a reference plane of said lower surface; and

flat surfaces inclined at a crossing angle of not larger than 10 degrees with respect to said reference plane and provided so that a projected area of said flat surfaces on said reference plane is not smaller than 8 times as large as a projected area of said slopes on said reference plane.
